

## REMARKS/ARGUMENTS

Reconsideration and withdrawal of the rejections of the application are respectfully requested in view of the remarks herewith, which place the application into condition for allowance.

### I. STATUS OF THE CLAIMS AND FORMAL MATTERS

Claims 1, 2, and 5-19 are currently pending and are rejected in the Office Action mailed on August 26, 2009. Claim 5 is hereby amended to correct a dependency. No new matter is added by this amendment.

### II. REJECTIONS UNDER 35 U.S.C. § 102 and § 103

In the Office Action, claims 1, 2, 7, 14, 15, and 19 are rejected under 35 U.S.C. § 102(b) as allegedly anticipated by U.S. Patent No. 2,356,938 to Lombard ("Lombard").

Claims 5, 6, 8, 9, and 16-18 are rejected under § 103(a) as allegedly unpatentable over Lombard.

Claims 1, 2, and 5-19 are rejected under § 103(a) as allegedly unpatentable over ZA 20017995 ("ZA '995") in view of *Chemical Vapor Deposition of Boron and Boron Nitride from Decaborane* by Kim, et al. ("Kim").

Claims 1, 2, 5-9, and 14-16 are rejected under § 103(a) as allegedly unpatentable over U.S. Patent No. 5,611,828 to Celikkaya ("Celikkaya") in view of U.S. Patent No. 1,897,214 to Ridgway ("Ridgway") and Kim.

Applicants respectfully traverse the rejections for at least the following reasons.

Independent claim 1 recites:

**A process for producing a boron coated abrasive**, the process including the steps of contacting the abrasive to be coated with a boron source comprising **boron powder combined with boric acid**, at a coating temperature of about 800°C to about 1200°C in an inert atmosphere, for a time sufficient to coat at least a portion of the abrasive. (Emphasis added.)

Claims 5, 6, 8, 9, and 16-18 depend from claim 1 and include all of the limitations of claim 1.

As presently understood by the Applicants, Lombard discloses a vitrified diamond grinding wheel. *Lombard*, column 1, lines 1-2. The wheel disclosed comprises a mass of diamond particles held in a vitreous or ceramic bonding matrix. Lombard includes boron, a boride or an oxidizable boron compound in the vitreous bonding matrix to prevent detrimental swelling and to provide solid granular material for the vitrified bonded framework. *Id.*, page 2, left column, lines 55-68. The additive is preferably a boride. *Id.*, page 2, right column, lines 8-26.

Contrary to the assertion in numbered section 6 of the Office Action, Lombard does not disclose a process of coating an abrasive material with a boron coating. In fact, Lombard does not disclose any coating method, much less one which uses boron powder combined with boric acid as the coating source material. The boron, boride or oxidizable boron compound in Lombard is, instead, present in the vitreous bonding matrix as granular material (*See Lombard*, Examples I – IV, on pages 2-3).

Lombard discloses the abrasive periphery of the wheel is made from a “diamond containing ceramic mix.” *Id.*, page 2, left column, lines 15-16. The diamond particles are dispersed throughout the vitreous bonding matrix, the matrix containing the boron, boride or

oxidizable boron compound in Lombard. Lombard is silent as to any disclosure of a coating for an abrasive. Accordingly, Lombard fails to disclose a **process for producing a boron coated abrasive...** to be coated with a boron source comprising **boron powder combined with boric acid** as required by the claims.

Numbered section 7, on page 5 of the Office Action, rejects claims 1, 2, and 5-19 as allegedly unpatentable over ZA '995 in view of Kim. Applicants respectfully disagree.

ZA '995 discloses a method of coating abrasive particles with a ceramic coating. "The crux of the invention is that the abrasive particles are coated with a ceramic coating, which is produced either from an organometallic polymer or from a precursor or precursors of an organometallic polymer." ZA '995, last paragraph on page 3 to page 4. According to the Summary of the Invention on page 3, either an organometallic polymer, or precursor(s) of an organometallic polymer, capable of being pyrolysed to produce the ceramic coating is provided to a mass of abrasive particles to form a mixture, followed by pyrolysing the polymer or precursor. Although the step of providing the mixture can be accomplished in various ways as indicated on pages 4-5, in all cases the abrasive particles are first coated with an organometallic polymer or precursor. As the "crux of the invention" is the organometallic polymer or precursor(s), any coated abrasive not using such a polymer or precursor(s) would be against the teaching of the reference.

The Office Action asserts that page 5 of ZA '995 discloses boron powder and coating the abrasive with a boron carbide coating. Applicants respectfully disagree with the characterization of the disclosure in the cited portion of the reference.

Applicants submit the cited portion of the reference is silent on boron powder. Page 5 of ZA '995 does discuss the use of organometallic precursors that can be reacted in a mixture with

cubic boron nitride abrasive particles to produce an organometallic polymer on the particles.

Applicants submit that **a boron coated abrasive**, as claimed, is not the same as a cubic boron nitride abrasive particle coated with an organometallic polymer of precursor as disclosed in the reference.

Kim is directed to the chemical vapor deposition of boron and boron nitride from a decaborane. Kim discloses, in the second paragraph of the Introduction on page 2796, that a number of individual boron source compounds have been employed, including, among others, boric acid and evaporated boron. There is no disclosure or suggestion in Kim that boric acid and boron may be *combined* to yield a suitable source material.

Moreover, if ZA '995 was modified according to Kim, then the principle of operation of ZA '995 would cease to exist. A proposed modification that changes the principle of operation of the prior art invention does not support a *prima facie* case of obviousness. As explained at M.P.E.P. §2143.01:

If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)

Because the “crux” of ZA '995 is the organometallic polymer or precursor(s), replacement of that component of the mixture with the vapor deposition of Kim is counter to the teaching of ZA '995.

In numbered section 8 on page 8, the Office Action rejects claims 1, 2, 5-9, and 14-16 as unpatentable over Celikkaya in view of Ridgway and Kim.

Celikkaya is directed to a method of producing alpha alumina-based abrasive particles having a metal boride coating. *Celikkaya*, column 2, lines 34-37. Applicants submit that a

person skilled in the art of coating alumina-based abrasive particles would not look to Ridgway or Kim to seek a better or alternative boron source for coating. Ridgway, as discussed below, is directed to a method of making boron carbide abrasive, not a boron coating. Kim, as discussed above, is directed to the vapor deposition coating of boron or boron nitride using *either* boric acid *or* evaporated boron as a boron source compound. Nothing in Kim suggests using both.

The Office Action concedes that Celikkaya fails to disclose boric acid in combination with boron powder. Instead, the Office Action relies on Ridgway to disclose boric acid and boron oxide are known boron precursors. Applicants respectfully disagree with the characterization of the disclosure in Ridgway.

Ridgway is directed to boron carbide and a method of making. *Ridgway*, page 1, lines 1-2. According to Ridgway, boron carbide may be made by heating boron oxide with carbon. In an alternate process, boric acid may be heated to remove the water of crystallization to form anhydrous boron oxide, which is then mixed with carbon for further processing. *Id.*, page 1, line 80-page 2, line 5.

Ridgway is silent on coating an abrasive with a boron coating. The heating of boron oxide in the presence of carbon disclosed in the reference is to create boron carbide. Separately, the heating of boric acid is to form anhydrous boron oxide as a step in the production of boron carbide. In both cases, the boron carbide is useful for "abrading or grinding." *Ridgway*, page 1, lines 34-35. This is not **a boron coated abrasive** as required by the claims. Nothing in the reference discloses or renders predictable **a process for producing a boron coated abrasive...to be coated with a boron source comprising boron powder combined with boric acid** as required by the claims.

For at least the foregoing reasons, it is believed that independent claim 1 patentably distinguishes over the relied upon portions of Lombard, ZA '995; Celikkaya, Ridgway and Kim, either alone or in combination, and is therefore allowable. Further, claims 2 and 5-19, which depend from claim 1, are allowable as well.

The Examiner has made of record, but not applied, several documents. The Applicants appreciate the Examiner's implicit finding that these documents, whether considered alone or in combination with others, do not render the claims of the present application unpatentable.

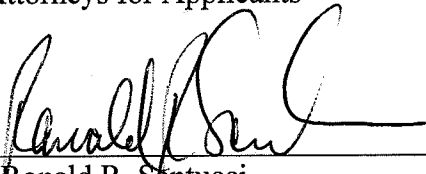
Statements appearing above with respect to the disclosures in the cited references represent the present opinions of the Applicants' undersigned attorney and, in the event that the Examiner disagrees with any such opinions, it is respectfully requested that the Examiner specifically indicate those portions of the respective reference providing the basis for a contrary view.

**CONCLUSION**

In view of the foregoing, it is believed that the present application is in condition for allowance. Accordingly, Applicants' attorneys respectfully request that a timely Notice of Allowance be issued in this case.

Please charge any fees incurred by reason of this response and not paid herewith to Deposit Account No. 50-0320.

Respectfully submitted,  
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